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Preventing Eating Disorders in Women's Competitive Gymnastics

Narrative literature review

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| <p>The occurrence of eating disorders in women's artistic gymnastics has been studied relatively little. Eating disorders are one of the most common mental health disorders among young people. Young elite athletes are at greater risk of developing an eating disorder compared to their peers who are not involved in sports. The aim of this thesis was to find and describe the risk factors, prevention and intervention of eating disorders.</p> <p>This thesis was conducted as a narrative literature review and the data was analysed using inductive data analysis. Systematic data search from four databases produced nine peer-reviewed articles from scientific publications.</p> <p>As a result, six categories of risk factors were discovered: parental influence, culture of criticism and unhealthy attitudes, weight monitoring and comments from an influential person, dieting, seasonal changes and lack of guidance. Furthermore, six categories of preventative factors were also discovered: effects of intervention, methods of intervention, education for coaches and parents, predictive factors, change in mindset as well as support and counselling. The results were formulated into a figure combining the risk factors, preventative factors and intervention.</p> <p>Based on the results, intervention, education and early detection of risk factors are effective means of preventing eating disorders. Due to small sampling, the results are not directly generalizable.</p> <p>The subject could be studied further by studying the long-term effects of intervention. Furthermore, risks and prevention of eating disorders among retired elite athletes could be further examined.</p> | |
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| <p>Syömishäiriöiden esiintyvyyttä naisten kilpatelinevoimistelussa on tutkittu verrattain vähän. Syömishäiriöt ovat yksi yleisimmistä nuorilla esiintyvistä mielenterveyden häiriöistä. Nuorilla huippu-urheilijoilla on suurempi riski sairastua syömishäiriöön verrattuna ikätovereihinsa. Tämän opinnäytetyön tarkoituksena oli löytää ja kuvata syömishäiriöiden riskitekijöitä, niiltä suojaavia tekijöitä ja intervention keinoja.</p> <p>Tämä opinnäytetyö toteutettiin kuvailevana kirjallisuuskatsauksena ja aineisto analysoitiin induktiivista sisällönanalyysiä käyttäen. Systemaattinen haku neljästä tietokannasta tuotti tuloksena yhdeksän vertaisarvioitua tieteellistä artikkelia</p> <p>Opinnäytetyön tuloksena muodostui kuusi riskitekijöiden yläluokkaa: vanhempien vaikutus, kritiikin kulttuuri ja epäterveet asenteet, painon tarkkailu ja tärkeiden läheisten kommentit, painonhallinta, kilpailukauden vaihtelut ja ohjauksen puute. Suojaavista tekijöistä yläluokkia muodostui myös kuusi: intervention vaikutukset, intervention keinot, vanhempien ja valmentajien koulutus, ennustavat tekijät, muutos ajatusmalleissa sekä tuki ja ohjaus. Tuloksista koottiin syömishäiriöiden ennaltaehkäisyn, intervention ja riskitekijät yhdistävä kaavio.</p> <p>Tulosten perusteella interventio, koulutus ja riskitekijöiden aikainen tunnistaminen ovat tehokkaita ennaltaehkäisyn keinoja. Pienen otannan vuoksi tulokset eivät kuitenkaan ole suoraan yleistettävissä.</p> <p>Aihetta voisi tutkia pidemmälle esimerkiksi tutkimalla intervention pitkäaikaisvaikutuksia. Myös urheilu-uransa päättäneiden huippu-urheilijoiden syömishäiriöiden riskejä ja ehkäisemistä olisi hyvä tutkia lisää.</p> | |
| Avainsanat | Syömishäiriö, ehkäiseminen, telinevoimistelu |

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1 Introduction

Girls who are involved in women's artistic gymnastics, later referred to as WAG, or other aesthetic sports, are at heightened risk of developing an eating disorder, compared to their peers who are not involved in such sports. (Charpentier 2017, p. 47.) This needs to be examined further in order to help the professionals around these sports to tackle the issue at an earlier stage. This thesis is conducted to provide understanding and methods for gymnastics coaches to be able to prevent eating disorders from occurring in their gymnasts or to help them intervene at an earlier stage when they detect disordered eating patterns in their gymnasts. The main focus will be the most common eating disorders: anorexia nervosa, bulimia nervosa and binge eating disorder (BED) and the methods for preventing these disorders.

The severity of disordered eating varies considerably among female athletes. It can range from mild food restriction or occasional usage of laxatives to eating disorders that meet the diagnostic criteria. (Kleposki 2002, p. 26.) In this thesis, the term disordered eating is used to describe disordered eating patterns that do not yet meet the criteria of an eating disorder, while the term eating disorder is used for a diagnosed eating disorder. Besides malnutrition, disordered eating can also cause amenorrhea, osteoporosis and other complications (Kleposki 2002, p. 27). Young elite athletes who are at a risk of contracting an eating disorder, are also more likely to have a tendency for anxiety or depression. Athletes who are dieting to meet the demands of a thin appearance are at risk of receiving insufficient energy. (Sabato, Walch & Caine. 2016, p. 101.)

Athletes in some sports are more vulnerable to developing an eating disorder. Such sports are aesthetic sports, such as gymnastics, and sports requiring a certain weight limits like wrestling. Many athletes who have suffered from eating disorders have reported receiving comments on their weight or size inside the sport, but nutrition guidance has varied considerably depending on associations preparedness. (Charpentier 2017, p. 47.) Eating disorders are more likely to occur in sport where the female body is emphasized as thin and lean. (Sabato et al. 2016, p. 101.)

Coaches also play a large role in gymnasts and other athletes' overall wellbeing. Lack of knowledge or ignorance in training can cause physical and emotional damage to young athletes (Sabato et al. 2016, p. 106).

This thesis was written for the Fliku-82 gymnastics club to help coaches to prevent eating disorders and to spread knowledge on the matter. The aim of this thesis was to find some ways to prevent eating disorders in women's competitive gymnastics (WAG). The objective of this thesis was to produce new information and viewpoints for coaches to raise the awareness of eating disorders and preventative methods. This thesis was conducted as a narrative literature review to examine the methods for preventing development of an eating disorder.

2 Eating disorders

The most commonly known eating disorders are anorexia nervosa, bulimia nervosa and binge eating disorder, BED. Eating disorders are the most common and one of the most dangerous mental health problems amongst the young girls and it has been estimated that up to 20% of young girls suffer from disordered eating. This is a high figure compared to boys (5-10%) and the rest of the population (about 2%). (Charpentier 2017, p. 46.) Many studies have shown that young elite athletes are at greater risk of developing an eating disorder than young people not involved in sports, and there are more symptoms of disordered eating among athletes participating in aesthetic sports such as dancing or figure skating (Sabato et al. 2016, p. 101; Duodecim 2017a). Furthermore, the secretive-ness of eating disorders can cause a delay on seeking treatment (Duodecim 2017a; Duodecim 2017b).

2.1 Anorexia nervosa

Anorexia nervosa is more common in girls and young women than in boys and men. Over half of the patients suffer from the symptoms for many years and only the same number of patients get rid of the symptoms entirely. A typical patient with anorexia nervosa is a girl who is conscientious and precise and who has to take care of her weight because of her hobbies. (Duodecim 2017a.) Girls in sports tend to develop anorexia nervosa after an innocent attempt to change their diet to succeed in sports. Dieting starts

slowly and it tends to follow the patterns of the latest dieting trends such as avoiding carbs or fat. (Charpentier 2017, p. 46.)

The diagnostic criteria for anorexia nervosa are quite strict and that is why many female athletes do not meet them regardless of having clear patterns of disordered eating. To meet all the diagnostic criteria the patient has to have a fear of maintaining normal body weight or achieving it, and be 15 per cent under the expected weight, intensely fearful of gaining weight, have a disturbed body image and suffer from amenorrhea if she is post-menarcheal. (Kleposki 2002, p. 28.) It is important to recognise anorexia nervosa as quickly as possible for the treatment to start at as early a stage as possible. In the most severe cases, treatment takes place in a hospital ward but most of the time therapy is carried out in outpatient care. (Duodecim 2017a.)

2.2 Bulimia nervosa

In bulimia nervosa, patients tend to over eat a large amount of food and then avoid and compensate for the weight gain by either vomiting or using excessive amounts of laxatives (Charpentier 2017, p. 46). To meet the criteria of bulimia nervosa the patient must have had recurrent episodes of binge eating and a sense of lacking control during those episodes, as well as having some inappropriate compensatory methods afterwards, with both bingeing and compensating for weight gain occurring at least twice a week. Similar to anorexia nervosa, bulimia nervosa sufferers have a disturbed self-image, and self-evaluation is performed on the basis of one's appearance. (Kleposki 2002, p. 28.) Bulimic behaviour can also occur in anorexia nervosa or in binge eating disorder. (Duodecim 2017b)

Approximately 10% of young womens meet the diagnostic criteria of bulimia nervosa but it is estimated that up to 20-40% of young women display occasional bulimic behavior. Bulimia nervosa is rarer among boys than girls. Previous studies have shown that one fifth of patients suffer from bulimic behaviour for several years while about half of the patients eventually recover. (Duodecim 2017b.)

2.3 Binge eating disorder, BED

In binge eating disorder, later referred to as BED, patients eat large quantities of food, but unlike bulimia nervosa, they do not try to get rid of it. Eating is experienced as unmanageable and chaotic, and the quantities of food are much larger than normally eaten. Approximately half of those suffering from BED are overweight. (Charpentier 2017, p. 46.) Bingeing can be directed to sweets or other usually forbidden food item or to food in general (Duodecim 2018).

To meet the diagnostic criteria for BED, bingeing must be kept secret from others, involve a notable eating pace, eating until bloated even when not hungry at first, or strong feelings of self-hatred, guilt or depression (Duodecim 2018). BED is the most common eating disorder in Finland, but development is needed in diagnostic practices and referral to treatment (Syömishäiriöliitto n.d. a).

2.4 Consequences of eating disorders

As a result of low energy intake, anorexia nervosa can cause muscle weakness and decreasing of brawn as well as low blood pressure and a slow heartbeat. Anorexia nervosa may also lead to amenorrhea, which might result in osteoporosis and infertility. Anorexia nervosa also has psychological consequences, such as squeamishness, tantrums, hyperactivity, insomnia and feelings of isolation and loneliness. (Syömishäiriöliitto n.d. b)

In particular, long-term vomiting or excessive use of laxatives causes problems for both mind and body. The physical consequences include an imbalance in electrolytes, possible arrhythmia, stomach ache, digestion problems, red eyes as a result of vomiting, dental enamel damage, salivary glands swelling, a hoarse voice and irregular menstrual cycle. Psychologically, bulimia nervosa is demanding because of the constant dissatisfaction with one's body, secrecy and constant anxiety. (Syömishäiriöliitto n. d. c) BED engenders strong feelings of shame, which often leads to withdrawal from social situations and complicates seeking treatment (Syömishäiriöliitto n. d. a).

The consequences of eating disorders for society should also be noted. It is important to seek treatment immediately, for recovery to start earlier (Mielenterveystalo n. d.). As for

the monetary costs, it is important to diagnose an eating disorder as early as possible, as then the treatment is usually easier and less costly.

3 Aims and objectives

The aim of this thesis is to find some ways to prevent eating disorders in women's competitive gymnastics (WAG). The objective of this thesis was to produce new information and viewpoints for coaches to raise the awareness of eating disorders and preventative methods.

In order to achieve this aim, a narrative literature review is performed. This thesis attempts to answer the following research questions:

1. What are the risk factors for developing an eating disorder in aesthetic sports?
2. How can disordered eating be prevented in WAG?

4 Implementation and methods

A literature review is an umbrella concept that has multiple subtypes to suit different material. Irrespective of the type, all literature reviews nevertheless follow certain procedural patterns for acquainting the readers with previous material. The core idea of a literature review is to form a big picture of the area in question based on previous studies. A literature review aims to systematically implement all the steps and describe them in a detailed manner, so that when a person reads the review, they are able to assess the execution and trustworthiness of each phase. (Stolt, Axelin & Suhonen 2016, p. 23.)

A narrative literature review, also known as a traditional literature review, strives to describe existing, usually peer-evaluated, research. A narrative literature review can focus narrowly on varying research settings or it can be a broader description of certain procedures or methods used. Usually the study questions are comprehensive but, according to the field studied, this can vary. A narrative literature review consists of the process of collecting the literature and data synthesis, as well as analysing the collected data to indicate its value. (Stolt et al. pp. 8-9.) When choosing the content, one must define the

research questions in advance and choose data accordingly, even though other interesting perspective might arise during the process (Tuomi & Sarajärvi 2013, p. 92). In this thesis, the study questions are: “What are the risk factors for developing an eating disorder in aesthetic sports?” and “How can disordered eating be prevented in WAG?” These questions are of a quite comprehensive nature, which supports choosing a narrative literature review as the research method.

The disadvantage of a narrative literature review is that it does not take into account the trustworthiness of the data in the process of data collection. Furthermore, in a narrative literature review, the selection of literature does not have as strict guidelines as in some other forms of literature review. (Stolt et al. 2016, p.9) Because of this, in this thesis, the data collected will be critically evaluated. As a result, elements of a systematic literature review will also be included during the data collection phase.

4.1 Data collection and selection

In this thesis, the data was collected by performing a literature review and combining the collected information in a data synthesis. The data was processed to find patterns of disordered eating and ways to prevent eating disorders from occurring. The data were collected from the databases CINAHL, Medic, Academic Search Elite and Social Care Online using search words and combinations as presented in table 1.

Table 1. Search words used in data collection.

| | | |
|-----------------------|---------------|--------------|
| eating disorder | gymnastics | prevent |
| eating disorder* | gymnasts | prevention |
| anorexia nervosa | gymnast | prevent* |
| anorexia | gymnast* | intervention |
| anore* | elite athlete | interve* |
| bulimia nervosa | athlete | ehkäisy |
| bulimia | athlete* | ehkäis* |
| binge eating disorder | female | |
| BED | voimistelu | |
| syömishäiriö | voimistel* | |
| syömishäiriö* | sports | |
| disordered eating | sport* | |
| disordered eating* | | |

In a data search the results were limited to studies published after the year 1998. The timespan was so large due to the small amount of studies conducted on eating disorders in gymnastics. The language was limited to Finnish or English.

The inclusion and exclusion criteria for the data is presented in the Table 2, below. For an article to be chosen it needed to be peer-reviewed study, published in a nursing, medical or social scientific publication. The research had to concern eating disorders and their prevention them among young athletes.

Table 2. Inclusion and exclusion criteria of the data.

| Inclusion criteria | Exclusion criteria |
|---|--|
| nursing, medical or social scientific publication | not a scientific publication |
| peer-reviewed research | concerns eating disorders among non-athletes or adults |
| concerns eating disorders among young athletes and prevention or intervention | concerns only eating disorders among athletes without preventative slack |
| publication year 1998 or later | |
| Finnish or English language | |

The results of the data search are presented in the appendices as a table. (Appendix 1.) The searches were performed on the above mentioned databases using the search words and synonyms presented in Table 1 and inclusion and exclusion criteria presented in Table 2.

First, the search results were analysed based on the title of the article to meet the inclusion criteria. In the second phase, the abstracts of the articles that were included according to the title were read. Based on those abstracts, articles that did not concentrate on

both eating disorders among young athletes and prevention of such disorders, were excluded. The remaining articles were thoroughly studied, and based on the whole text, the articles that met all the inclusion criteria were chosen.

As a result of the search following nine articles were chosen. In Appendix 2., the articles are presented in more detail. The numbering of these articles matches the numbering on the categories of risk factors and preventative methods presented in Table 3. and Table 4.

1. Buchholz A., Mack H., McVey G., Feder S. & Barrowman N., 2008. BodySense: an evaluation of a positive body image intervention on sport climate for female athletes. *Eating disorders* 16 (4), 308-321.
2. Martinsen M., Bahr R., - Børresen R., Holme I., Pensgard A. M. & Sundgot-Borgen J., 2014. Preventing Eating Disorders among Young Elite Athletes: A Randomized Controlled Trial. *Medicine & Science in Sports & Exercise* 46 (3), 435-447.
3. Bloodworth A., McNamee M. & Tan J., 2017. Autonomy, eating disorders and elite gymnastics: ethical and conceptual issues. *Sports, Education and Society* 22 (2), 878-889.
4. Mockede Neves C., Fernandes Filgueiras Meireles J., Berbert de Carvalho P. H., Schubring A., Barker-Ruchti N. & Caputo Ferreira M. E., 2017. Body dissatisfaction in women's artistic gymnastics: A longitudinal study of psychosocial indicators. *Journal of Sports Sciences* 35 (17), 1745-1751.
5. Abood D. & Black D., 2000. Health Education Prevention for Eating Disorders Among College Female Athletes. *American Journal of Health Behavior* 24 (3), 209-219.
6. Kerr G., Berman E. & De Souza M. J., 2006. Disordered Eating in Women's Gymnastics: Perspectives of Athletes, Coaches, Parents, and Judges. *Journal of Applied Sport Psychology* 18 (1), 28-43.

7. Heffner J. L., Ogles B. M., Gold E., Marsden K. & Johnson M., 2003. Nutrition and Eating in Female College Athletes: A Survey of Coaches. *Eating Disorders* 11 (3), 209-220.
8. Heller Levitt D., 2008. Participation in Athletic Activities and Eating Disordered Behaviour. *Eating Disorders* 16 (5), 393-404.
9. Francisco R., Narciso I. & Alarcão M., 2013. Parental Influences on Elite Aesthetic Athletes' Body Image Dissatisfaction and Disordered Eating. *Journal of Child & Family Studies* 22 (8), 1082-1091.

4.2 Data analysis

The overall aim of a literature review is to critically assess and combine existing information and knowledge on a certain subject. The main advantage of a literature review is that it highlights the gaps in previous studies that need to be further examined. The main disadvantage of conducting a literature review, is that familiarization with previously written material might interfere with the researcher's analytical approach, as it always produces assumptions. (Carnwell & Daly 2001, p.57)

Content analysis is possible only after the content is chosen carefully and read thoroughly. In the actual analysis, the data were organized and categorized into themes to find the answers to the research questions. (Tuomi & Sarajärvi 2013, pp. 92-93.) In this thesis, the themes based on research questions were formed after categorizing important points according to their correspondence to research questions and dividing them into risk factors and preventative factors. Excerpts from the text were simplified and formed into subcategories, which were then categorized. The analysis done based on the collected data, by simplifying it to form conjunctive categories by finding the answers to research questions, was a model developed in 1984 by Miles and Huber (Tuomi & Sarajärvi 2013, p. 101).

In this thesis inductive content analysis was used. Inductive content analysis refers to a method of analysis where individual matters are examined in a more general way (Tuomi & Sarajärvi 2013, p. 95). Many similar individual expressions can then be categorised in

the same category and generalisations can be made. In this thesis, the analysis was based on the data gathered rather than on prior assumptions or categorizations. Subcategories formed six categories of risk factors and six categories of preventative factors presented in Table 3 and Table 4. Categories were formed by combining similar subcategories into cohesive entities (Appendix 3.).

5 Results

5.1 Risk factors for developing an eating disorder

Data analysis revealed multiple risk factors for developing eating disorders in aesthetic sports. These risk factors are presented in the following Table 3. The cohesive entities, categories, are parental influence, culture of criticism and unhealthy attitudes, weight monitoring and comments from an influential person, dieting, seasonal changes and lack of guidance.

Table 3. Risk factors

| Subcategory | Category |
|--|---|
| Parental influence in glorifying thinness as reflecting standards (9) | Parental influence |
| Maternal example (9) | |
| Weight teasing and concern of thinness as pathological parental influences (9) | |
| Coaches and gymnasts passing on problematic attitudes and practices (3) | Culture of criticism and unhealthy attitudes |
| Culture of criticism as part of the sporting environment (9) | |
| Unhealthy attitudes towards eating and weight by coaches and athletes (7) | |
| Pressure to be thin in the sport environment (1) | |
| Weight monitoring and commenting on body weight by coaches (7) | Weight monitoring and comments from an influential person |
| Weight monitoring by coaches (7) | |
| Effects of comments from coaches (6) | |
| Effects of comments from valued persons (6) | |
| Disordered eating as a chosen strategy (3) | Dieting |
| Weight loss as a trigger for eating disorder (4) | |
| Competition anxiety and drive for thinness (5) | Seasonal changes |
| Lack of proper guidance regarding equipment (8) | Lack of guidance |
| Risks in recreational sports opposed to organized sports (8) | |

More than one of these risk factors can be present simultaneously. Even if athlete possesses many of this risk factors, it necessarily does not indicate inevitably developing eating disorder.

5.1.1 Parental influence

The role of parental influence on body image and the development of an eating disorder has been proved in many studies. Parental influence factors are presented in Table 3. One of the main means of parental influence is transference of parents' opinions and attitudes to their children. These attitudes can be both positive and negative, and the transferred mindsets can have long-term consequences for the development of body image and self-esteem. (Franciso, Narciso & Alarcão 2012, pp. 1082-1083.)

Moreover, the example set by parents plays an important role in the development of healthy or unhealthy attitudes and behaviour towards food and eating. In particular, the role of maternal modelling on girls' attitudes is huge. Family relationships, too, can have a tremendous effect on the development of pathological eating habits and attitudes towards food as the children of families with closer relationships, are more likely to have higher self-esteem and tend to have more satisfaction with their appearance. (Franciso et al. 2012, p.1083.)

Parental influence has the most effect, especially among athletes, when the parent is concerned about the child's weight or thinness or when displaying weight teasing. Then again, within the general population of non-athletes, the mother's example has a greater effect on body dissatisfaction and disordered eating. (Franciso et al. 2012, p. 1089.)

According to Franciso et al. (2012, p. 1089), the attitudes and behaviours of parents might be a reflection of a thin body being the standard of beauty. Parents' role in preventing disordered eating is crucial. If a mother displays disordered eating patterns, it is more likely that her daughter will adopt them. Parents' lack of support or autonomy may lead to a greater risk of their child of having a disturbed body-image later. Studies have shown a clear connection between parental influence and disordered eating in elite athletes group but not among non-athletes. (Sabato et al. 2016, p. 105.)

5.1.2 Culture of criticism and unhealthy attitudes

In a gymnastics environment the pressure to be thin is created inside the sport (Buchholz, Mack, McVey, Feder & Barrowman 2008, p. 319), and there is a culture of criticism which parents also seem to follow (Francisco et al. 2013, p. 1088). An environment criticising shape, size and performance creates a greater risk of developing eating disorder.

Criticism and pressures created by coaches, other athletes, and even family members, perpetuate the problematic attitudes inside the sport. Pressures concerning weight and shape are passed on between gymnasts and coaches (Bloodworth, McNamee & Tan 2017, p. 888), exposing athletes to disordered eating while trying to meet the expected shape.

The culture of criticism inside the sport of gymnastics, combined with the unhealthy attitudes towards shape and size displayed in Table 3., should be recognised as a risk factor for young athletes developing pathological eating and weight loss habits. A study conducted to examine coaches weight monitoring attitudes found that a large proportion of coaches monitored their athletes weight, at least at some level. Weight monitoring and suggestions to lose weight, made directly or indirectly, have an impact on athletes and might trigger unhealthy weight-loss practices. (Heffner, Ogles, Gold, Marsden & Johnson 2003, pp. 216-217.)

5.1.3 Weight monitoring and comments from an influential person

According to Kerr, Berman and De Souza (2006, p.28), weight teasing and negative commenting have serious consequences for body image and can cause disordered eating patterns, especially within younger girls. As seen in Table 3., weight monitoring and commenting on body weight or appearance, especially if done by influential persons such as parents or coaches, can be risk factors for developing disordered eating patterns or other pathological eating related behaviours.

Coaches have a lot of power in a sports setting. In one study, many respondents highlighted the level of control that coaches exert over weight-related issues in a gymnastics setting and that some coaches use their power inappropriately. As a coach is a very influential person in a gymnast's life, the comments the coach makes on the gymnast's appearance have a significant effect. Gymnasts who receive negative comments related to their weight or appearance, are more likely to believe they need to lose weight. This mindset can lead to disordered eating patterns or eating disorder. (Kerr et al. 2006, p.39.)

According to Heffner, Ogles, Gold, Marsden and Johnson (2006, pp. 217-218), rather than having coaches in charge of weight monitoring and nutrition guidance, it would be better to have physicians, athletic trainers or other professionals take care of the matter.

This is due to coaches being under constant pressure to get their athletes to the top and other professionals being more trained in nutritional matters.

5.1.4 Dieting

In their research, Bloodworth, McNamee and Tan (2017) found that in a gymnastics setting it might be difficult distinguish pathological attitudes concerning dieting, weight and shape from chosen strategies to succeed in sport. Weight monitoring and dieting might, at first, be a chosen strategy to meet the demands of sport, but as a result it can trigger an eating disorder (Table 3).

In a sports environment, where taking control of weight is justified and normalized, it is harder to recognize problematic and dangerous dieting practices (Bloodworth et al. 2017, p. 887). In a study conducted by Mockdece Neves, Fernandes Filgueiras Meireles, Henrique Berbert de Carvalho, Schubring, Barker-Ruchti and Caputo Ferreira (2017, p. 1749), researchers found that there is a risk of developing eating disorder after trying to lose weight to perform better.

Dieting and weight loss may be a chosen strategy at first to improve performance, but, in a gymnastics environment, it can be concerning due to unhealthy attitudes towards shape and size. Weight control is seen as normal in a gymnastics setting (Bloodworth et al 2017, p. 887), which is crucial to recognize when assessing the risk dieting in that environment causes.

5.1.5 Seasonal changes

In a study by Abood and Black (2000), competition anxiety was firmly linked with a decrease in the drive for thinness. Changes of season, meaning competition and training seasons, appear to either decrease or increase the drive for thinness. As the season changes to the competition season, the drive for thinness decreases. In a psychosocial model for the development of pathological eating behaviours and attitudes among female college athletes, competition anxiety was found to be a predictive factor of eating disorder when it was present together with body dissatisfaction and concerns of appearance (Abood & Black, 2000).

Abood and Black (2000) also suggest that the connection between competition anxiety and drive for thinness should be further studied to find effective ways for intervention.

5.1.6 Lack of guidance

Taking part in recreational sports instead of guided practices under some sport association might result in a greater risk of developing an eating disorder, suggests the study done by Dana Heller Levitt (2008, p. 399). Sport clubs and associations might offer support and guidance to their athletes that athletes outside these organisations do not get (Table 3). Secrecy is typical to eating disorders and is enabled easier in recreational sport environment with less monitoring and continuity, than in organized sport environment.

Dana Heller Levitt (2008, p. 399), noticed that structure and endorsement are needed in preventing eating disorders. Guidance and support help to decrease the risk of developing eating disorder, and that is why taking part in organized sport environment is beneficial.

5.2 Prevention

There have been no studies conducted on a larger scale on how to prevent eating disorders among young elite athletes. On the other hand, it has been shown that early intervention is important in order to prevent new cases of eating disorders from developing in young female athletes. (Martinsen, Bahr, Børresen, Holme, Pensgaard & Sundgot-Borgen 2014, pp. 435-436.)

Preventative factors gathered in the result of data analysis are presented in Table 4. Formed categories are effects of intervention, methods of intervention, education for coaches and parents, predictive factors, change in mindset as well as support and counselling.

Table 4. Prevention

| Subcategory | Category |
|---|-----------------------------------|
| Intervention programme in preventing new cases of eating disorders (2) | Effects of intervention |
| Positive effect of including coaches in the intervention (2) | |
| Positive effect of intervention (1) | |
| Social ecological approach as a preventative method (1) | Methods of intervention |
| Educational intervention (5) | |
| Health education as a form of intervention (5) | |
| Educating coaches (6) | Education for coaches and parents |
| Educating parents of their power (9) | |
| Sex BMI and parental influence as predictors (9) | Predictive factors |
| Body dissatisfaction and disordered eating differ in accordance with competitions (4) | |
| Emphasis on initiating positive body image (1) | Change in mindset |
| Change in a mindset of a perfect gymnast body (6) | |
| Reducing body dissatisfaction by focusing on the drive to be thin (5) | Support and counselling |
| Minimizing damaging behaviours and attitudes by support and prevention (8) | |

To be able to prevent eating disorders effectively, it is important to be aware of all aspects of prevention of eating disorders. Preventative methods are introduced in the following chapters.

5.2.1 Effects of intervention

As can be seen in Table 4, intervention and intervention programmes have a positive effect on disordered eating and eating disorders. An intervention programme that focuses on changing the attitudes, beliefs and behaviour, can reduce the pressure to obtain a certain body type or composition (Buchholz et al. 2008, pp. 318-319).

When conducting a prevention programme or an initiative, it is beneficial, to focus on promoting health as well as increasing protective factors. Furthermore, when coaches are included in the intervention the results tend to be more positive, compared to an initiative without the participation of coaches. (Martinsen et al. 2014, p. 445.)

To have the best possible outcome, it is important to include the coaches in the intervention programme. The coaches should be provided with facts and information about self-esteem, self-efficacy, mental training, body composition and proper sports nutrition. They also need to be aware of how to manage and identify weight issues and eating disorders, as well as disordered eating patterns. (Martinsen et al. 2014, p. 437) This enables the coaches to establish a comprehensive understanding of eating disorders and disordered eating in sports environment, and tools for more effective intervention when needed.

5.2.2 Methods of intervention

The study done by Bucholz et al. (2008, p. 319), supported the fact that social ecological approach in intervention is beneficial in preventing disordered eating. Social ecological intervention takes notice on athlete's interaction between various people and influencers, such as family and friends, school, extracurricular activities and media. Intervention methods differ, as seen in Table 4, whilst all of them have positive impact (Bucholz et al. 2008, p. 319; Abood et al. 2000).

To reduce the drive for thinness and body dissatisfaction, educational intervention is beneficial. Educating athletes on self-esteem, nutrition, pressures of performing and stress control reduces athletes drive for thinness by decreasing body dissatisfaction. (Abood et al. 2000)

Emphasizing health and wellbeing in intervention, on the contrary of unhealthy weight loss methods, appears to have had a more positive impact on athletes. Educational intervention has a far-reaching impact and can protect athletes later from declining self-esteem. (Abood et al. 2000.)

5.2.3 Education for coaches and parents

Parental influence on athlete's body image and disordered eating, has a significant connection, and therefore parental education is convenient. Parents have a great impact on their adolescent athlete and values are transferred within family. Comments concerning body image, even if not directed to their child, can predict body dissatisfaction or disordered eating. (Francisco et al. 2013, pp. 1088-1089.)

As seen in Table 4, the education is important for parents as well as for coaches as a prevention for eating disorders in aesthetic sport environment.

Educating coaches is important in order to avoid unhealthy weight loss practises, nutrition advises or attitudes passing on to their athletes. Despite the knowledge coaches already have on eating disorders, there is still a need for more education on child's development to adolescent, nutritional facts, body image as well as psychological issues related to elite gymnastics. (Kerr et al. 2007, p. 39.)

Comments on athlete's body and suggestions to lose weight based only on appearance are done by coaches as well as parents (Kerr et al. 2007, p. 40; Francisco et al. 2013, p. 1089). It may be, that coaches determine the need of weight loss only by appearance because of the lack of right knowledge or for the fact, that small and lean body is seen so crucial in gymnastics (Kerr et al. 2007, p.40).

5.2.4 Predictive factors

There are only a few predictive factors when detecting body dissatisfaction or disordered eating (Francisco et al. 2013, p. 1089), and they are introduced in Table 4. Sex, BMI, or body mass index, in addition to parental influence, can predict the risk for developing eating disorders among adolescent. (Francisco et al. 2013, p. 1089). Female sex, low BMI and an example set by parents for pathological eating habits in order to lose weight,

are risk factors for developing eating disorders, and can be used as predictors in preventative actions.

In gymnastics, the body dissatisfaction differs throughout the competition year. In competition season body dissatisfaction is higher than before or after competition season. Body dissatisfaction can lead to disordered eating in attempt to lose weight, and needs to be taken into a consideration especially in competition season. (Mockede Neves et al. 2017, pp. 1749-1750.)

5.2.5 Change in mindset

As seen in the Table 4, a change in mindset could have a positive preventative effect on eating disorders. Then again, in gymnastics setting, if the attitudes, beliefs and expectations concerning a certain body type as being superior for the sport could be changed, the occurrence of eating disorders could be affected. (Buchholz et al. 2008, p. 317) According to Kerr, Berman and De Souza (2007, p. 33), especially many parents of gymnasts wish for a more accepting atmosphere, in which gymnasts with all body types would be appreciated more.

To be able to best implement a preventative initiative, it could be beneficial to introduce the programme as being about a positive body image, rather than introducing it as prevention of eating disorders. This is due to the culture in the sport emphasizing a certain body type to be the desired one. (Buchholz et al. 2008, p. 319.) Also, the secretive nature of eating disorders suggests that emphasizing positive body-image is important.

In a study by Kerr et al. (2007, p. 39), it is suggested, that the problem with body image in the sport comes from the gymnastics culture as well as from media. They also point out that many of the participating gymnasts recognized this as being an influence from outside rather than their own personal issues.

5.2.6 Support and counselling

As seen in Table 4, a positive and supportive approach is beneficial in preventing eating disorders. Abood et al. (2000) suggest, that when intervening, the concentration should be on strengthening attitudes that promote health and healthy ways to promote athletic

success. They also promote not sharing any pathological methods for losing weight, so that the athletes who have a risk to develop an eating disorder, will not familiarize themselves with these methods.

Before the eating disorder is so severe it needs to be treated in a clinical environment, preventative measures can be implemented by a counsellor. A counsellor can provide for example support and education. Furthermore, the counsellor can make referrals or consult other professionals when an intervention is needed. (Heller Levitt 2008, pp 400-401.)

To reduce body dissatisfaction, it might be important to focus on the drive to be thin. Also, self-esteem is related to drive to thinness. As self-esteem rises, the drive for thinness decreases. (Abood et al. 2000.)

6 Discussion

6.1 Reflection of results

Based on the results of this thesis, the key for successful prevention of eating disorders is to include family and coaches to intervention and education. In the best-case scenario, the education has prevented new cases of eating disorders in sport setting. As the best-case scenario seldom is the outcome, it is important to be aware of the risk factors leading into eating disorder. As can be seen in Figure 1, there are multiple factors that need to be taken into consideration in prevention of eating disorders.

To be able to intervene when spotting an already existing eating disorder, it is crucial to be aware of the risk factors and symptoms. Of course, it is also important to know that not everyone who shows some of the symptoms or possesses some of the risk factors, will develop eating disorder. But to be able to spot these risk factors and intervene, it is necessary to have the knowledge on what signs to search for and what to do when spotting these signs.

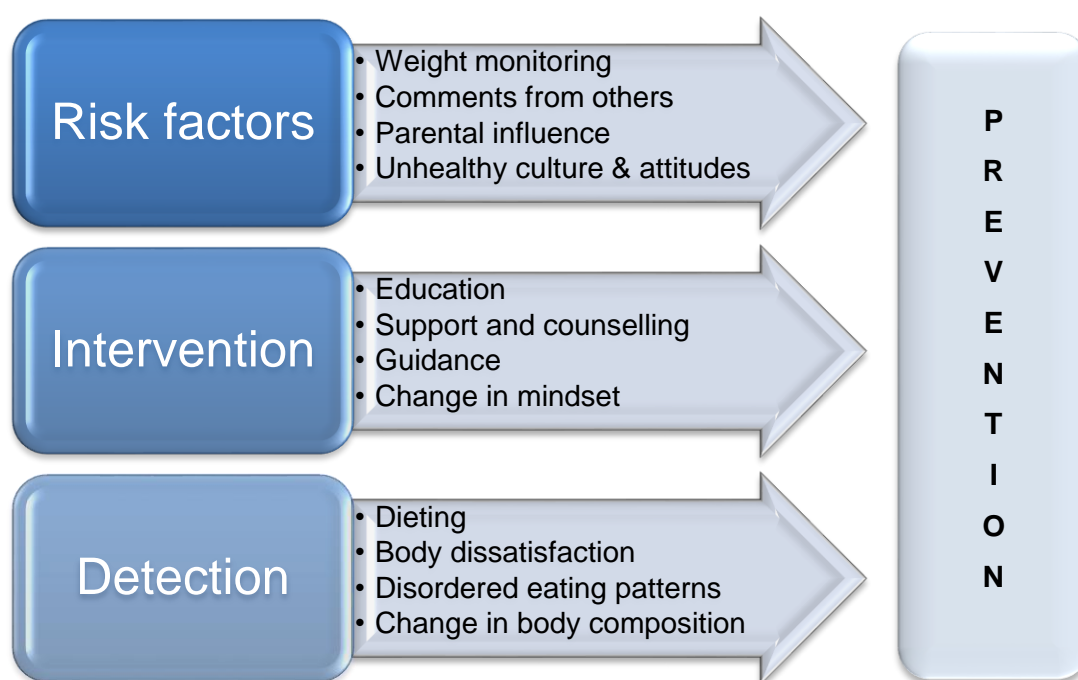


Figure 1. Prevention of eating disorders

As many of the risk factors and pathological eating patterns have something to do with the eating behaviour, such as dieting or restricting food, or being overly concerned about food-related issues and weight changes, the parent's play a huge role in prevention and intervention of eating disorders. As the parents are usually the ones to prepare and serve food at home, they have first-hand information about the behaviour related to that and are in a key position when it comes to detecting early signs of disordered eating. Also, they have the ability to show positive example as well as provide positive feedback to their child to help the child form a healthy relationship with food and eating.

Furthermore, one of the main risk factor is commenting the athlete in a negative way. This also includes the unhealthy atmosphere in the sport environment. To be able to prevent this negative commenting and atmosphere, it is important to educate both coaches and parents, but also the gymnasts, of the power their words and comments have. Furthermore, the education should also include subjects such as proper nutrition and healthy training. Guidance about, for example, how to use gym equipment and where to seek help if needed, could be added into the educational intervention.

One good way of intervening in pathological or disordered eating is by support and counselling. This requires adequate services and the knowledge about where to ask for them.

Counselling services could be, for example, provided by the gym club or even the gymnastics federation. It would be beneficial for the coaches to know about the services available and where to find them. That way, whenever they either detect themselves or are approached by parents with concerns about their child, they could forward them to the right services.

6.2 Ethics and validity

The core of any scientific action is ethicalness (Kankkunen & Vehviläinen-Julkunen 2013, p. 211). The baseline of ethics in this thesis was *Hyvä tieteellinen käytäntö* (2012), written by TENK. By carefully collecting, examining and reporting as well as critically evaluating the data, the core of ethics was met. Furthermore, it is crucial to respect the previously conducted researches, especially when conducting a literature review, which relies solely on the previously developed literature. (TENK 2012, p.6.)

Research ethics can be divided into two categories, ethics within the science and ethics outside it. Ethics within the science usually refers to how reliable and truthful the field or study is. This means studying the relations between the subject, the aims and objectives as well as the whole process of research. One of the main things in considering reliability, is that the research is done respecting the legislation, no research material is created from nothingness and that everything is reported correctly. Also, critically evaluating a research means that all the grounds and methods are evaluated from various viewpoints. (Kankkunen et al. 2013, p. 212.)

Ethics outside science is dealing with issues like how do external factors affect the subject of the research and how is the matter being taken into consideration. Such factors include for example funding and how the investors interests affect the research. (Kankkunen et al. 2013, p. 212.) Different interpretations on the matter does not always mean that there is a reliability issue inasmuch different interpretation can add comprehension on the matter (Kylmä et al. 2012, p.129).

This thesis was conducted by choosing only peer-reviewed scientific articles from academic journals, to ensure the correctness of the gathered data. By choosing the data carefully the impact of biased results to this thesis was minimized.

Validity means that the study or research has been studying exactly the factors that it was supposed to study. External validity signifies how the results of the study can be applied to external universe, meaning outside the study group. This results in the researcher having to ponder on how to apply the results into the general population. (Kankkunen et al. 2013, p. 189.) Validity requires that the whole research process is recorded so precisely that some other researcher can conduct a research in outline (Kylmä et al. 2012, p. 129).

In this thesis the research was executed as well as possible by choosing the articles from different databases and using all the combinations of search words, that could be put together to form a reasonable entity. There were only nine articles found in the systematic data search, which means, that the results of this thesis cannot be generalised without questioning. The main problem with the chosen articles and validity of the results is that the sampling size in the used studies was quite small. Also, the studies were conducted in other countries, so the results might not be transferable to Finland, as is.

There is a risk of attitudes or assumptions of researchers to have impact on how to approach the matter and how the results are interpreted. To avoid that, the data was searched thoroughly and the results were registered in detail.

6.3 Credibility, reflexivity and transferability

In this thesis, credibility, reflexivity and transferability are also evaluated. They are usually used as an evaluation criterion in a qualitative research, but in this case, they are used in an adaptive manner. Credibility means that the research and its results are trustworthy and the credibility or trustworthiness must be shown in the research. Researches credibility is solidified better when the researcher is involved in the matter for a longer period of time and discusses the matter with a fellow researcher. (Kylmä et al. 2012, p. 128.) As credibility is hard to evaluate, in this thesis, the articles were chosen and assessed carefully to obtain credibility.

Reflexivity indicates how well the researcher is familiar with their own premises as a researcher, as well as how they influence the gathered data and the phenomenon. These need to be taken into consideration in the research. (Kylmä et al. 2012, p. 129.) The articles were chosen from the databases using systematic data search and selected based on intake and exclusion criteria, not on personal opinions.

Transferability refers to being able to relocate the results to another setting. To ensure transferability, the descriptions of all the issues related to conducting a research or a study must be precise. If the descriptions lack precision, another researcher will not be able to replicate the study accurately. (Kankkunen et al. 2013, p.198) All the steps of data collection and selection were carefully documented.

Knowledge obtained by research can help to deepen the understanding of a phenomenon in a more precise way. In research, the aim is to describe the phenomenon as truthfully and as in-depth as possible. (Kylmä et al. 2012, p.174.)

6.4 Utilization

The scientific knowledge obtained by research can be utilized in either problem-solving or contextual way. In the contextual custom, the information helps to re-organize and develop a person's thinking. This enables questioning and developing existing practices and systems. Understanding is a key factor of research and it creates a basis for developing new practices and more effective interventions. As to the problem-solving manner of utilizing information, the main emphasis is on having a problem and trying to find solutions from existing researches. In practice, this means searching for data in databases and evaluating the validity of the information. If the data is reliable, it can be used to develop a solution to the problem at hand. (Kylmä et al. 2012, pp.174-176.)

As for this thesis, the information might help coaches, and other professional dealing with eating disorders in sport setting, to have deeper understanding of what the athletes with eating disorders are going through and by acquiring that knowledge, be able to help them more effectively. Thus, reading researches of certain topics can help to understand the situation of another person in a diverse situation. It can be shown, that healthy people might not have a clue of what it feels to have a disorder or to live in a transition point of life. (Kylmä et al. 2012, p.174.)

As for the following research suggestions, there is not too much research done on eating disorders on elite athletes after ending their career in aesthetic sports. Also, the long-term effects of intervention could be studied further.

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Data search results

| | | Eliminated based on: | | | | |
|--|-------------|----------------------|----------|------------|----------|--|
| Database and search term | All results | heading | abstract | whole text | Approved | |
| CINAHL | | | | | | |
| Eating disorders AND gymnastics AND prevention | 6 | 2 | 1 | 2 | 1 | Buchholz A. et al. 2008 |
| Anorexia AND athletes AND prevention | 21 | 13 | 2 | 4 | 2 | Bonci C. M. et al. 2008 & Currie A. 2010 |
| Anorexia AND gymnastics AND prevention | 1 | 0 | 0 | 1 | 0 | |
| Bulimia AND gymnastics AND prevention | 1 | 0 | 0 | 1 | 0 | |
| Bulimia AND athletes AND prevention | 18 | 7 | 5 | 4 | 2 | Martinson M. et al. 2014 & Williams G. 2016 |
| Medic | | | | | | |
| Anoreksia AND ehkäisy | 0 | 0 | 0 | 0 | 0 | |
| Syömishäiriö* AND ehkäisy | 2 | 0 | 0 | 0 | 0 | |
| Academic Search Elite | | | | | | |
| Gymnastics eating disorder* | 13 | 9 | 0 | 2 | 2 | Bloodworth A. et al. 2017 & Mockede Neves C. et al. 2017 |
| Prevent* eating disorder* female athlete | 8 | 3 | 1 | 3 | 1 | Aboud D. et al. 2000 |
| Prevent* disordered eating* athlete | 8 | 4 | 0 | 4 | 0 | |
| Gymnast* anorexia* prevent* | 12 | 8 | 1 | 2 | 1 | Bloodworth A. et al. 2017 |
| Gymnast* AND bulimi* AND prevent* | 2 | 0 | 1 | 1 | 0 | |
| Athlet* AND eating disorder* AND prevent* | 16 | 9 | 2 | 1 | 4 | Heller Levitt D. 2008. Francisco R. et al. 2013 |
| Gymnast* "eating disorder" | 11 | 9 | 0 | 0 | 2 | Kerr G. et al. 2006 & Heffner J. L. et al. 2003 |
| Social Care Online | | | | | | |
| Gymnast* eating disorder* prevent* | 35 | 35 | 0 | 0 | 0 | |

Content analysis of articles

| Article | Aims/ objectives | Target group & sample | Execution | Results | Results in relation to our research questions |
|--|---|---|---|--|---|
| 1. Buchholz A., Mack H., McVey G., Feder S. & Barrowman N., 2008. BodySense: an evaluation of a positive body image intervention on sport climate for female athletes. <i>Eating disorders</i> 16 (4), 308-321. der S. & Barrowman N., 2008. | To evaluate the effectiveness of a selective prevention program designed to reduce the pressure to be thin in sports and to promote positive body image and eating behaviours in young female athletes. | 118 female gymnasts, 118 mothers, 118 fathers and 48 coaches from 7 gymnastics clubs from Ontario, Canada. Randomly selected 4 as an intervention group and 3 as a control group. | The intervention group received a prevention program material and participated on workshops. Coaches, families and staff members received binders and a poster was hung on a gym's lockers. Gyms were also provided a "mini library" containing books and videos of body positivity etc. "Fuel tank" snack box was also given to clubs. Control group received the BodySense material at the end of the research. | The study showed that there is a strong pressure to be thin and lower weight and later start of puberty are seen as an advantage. Intervention had modest yet positive influence for lowering the pressure to be thin. | Intervention was beneficial for the target group as it may help to prevent eating disorders. |
| 2. Martinsen M., Bahr R., - Børresen R., Holme I., Pensgaard A. M. & Sundgot-Borgen J., 2014. Preventing Eating Disorders among Young Elite Athletes: A Randomized Controlled Trial. <i>Medicine & Science in Sports & Exercise</i> 46 (3), 435-447. | To examine the effectiveness of intervention as preventing new cases of eating disorders among adolescent elite athletes. | All of the 16 Norwegian Elite Sport High Schools were included, 9 as an intervention group, 7 as a control group. 711 athletes were invited. | The one-year intervention program was designed and carried out, focusing on self-esteem and self-efficacy. Coaches and "significant others" were included to the intervention. Athletes were provided lectures, videos and other material during the intervention while coaches had seminars of their own as well as participating athletes' lectures. | The trial showed it is possible to prevent new cases of eating disorders by one-year intervention program as well as showing positive effects on reporting symptoms of eating disorders. | Well produced, goal-directed intervention is beneficial to athletes participating in it and it can prevent eating disorders among the athletes even at the early stage. |

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|--|--|---|---|---|--|
| <p>3. Bloodworth A., McNamee M. & Tan J., 2017. Autonomy, eating disorders and elite gymnastics: ethical and conceptual issues. <i>Sports, Education and Society</i> 22 (2), 878-889</p> | <p>To understand the autonomy of elite gymnasts participating the study as eating disorders might have an effect on making informed choices and ability to understand them.</p> | <p>34 gymnasts and 9 staff members were interviewed in total. 18 of the gymnasts were female and 16 male and the mean age was 17,4.</p> | <p>The interviews were semi-structured done by two interviewers asking open-ended questions concerning their careers as a gymnast, pressures, attitudes towards eating and body shape. Staff members and coaches had different questions, which were trying to shed light on how to manage the pressures of elite gymnasts and their weight.</p> | <p>There is a very disciplined and obsessive attitude shape and weight. The struggle lays in spotting the pathological behaviour to the ones perceived to the means of succes in the sport.</p> | <p>There is a heightened risk on developing an eating disorder in gymnastics, because even young athletes are strived to meet the lean shape and lower weight and they feel the pressure from their team mates as well as from coaches.</p> |
| <p>4. Mockede Neves C., Fernandes Filgueiras Meireles J., Berbert de Carvalho P. H., Schubring A., Barker-Ruchti N. & Caputo Ferreira M. E., 2017. Body dissatisfaction in women's artistic gymnastics: A longitudinal study of psychosocial indicators. <i>Journal of Sports Sciences</i> 35 (17), 1745-1751.</p> | <p>To determine how gymnasts body dissatisfaction and risk factors for eating disorders, media, perfectionism and the state of mood change during the athletic year and how these indicators impact on body dissatisfaction on that time period.</p> | <p>The study was done in a WAG training centre in Rio de Janeiro. The including criteria was that the participants were 10 to 18 years old, trained 30h/week and were part of an internationally competing Tres Rios group and were willing to participate and willing to sign in to the study. Finally 20 participants met the criteria and were included to the research.</p> | <p>The study was 9 month longitudinal investigation where body dissatisfaction was measured by Body Shape Questionnaire (BSQ), disordered eating was detected by translated and validated Brazilian version of Eating Attitudes Test-26 (EAT-26), bodyfat by measuring skin folds, medias influence by The Sociocultural Attitudes Towards Appearance Questionnaire-3 (SATAQ-3), perfectionism by the Portuguese version of the Multidimensional Perfectionism Scale (MPS) and the state of mood by validated version of The Brunel Mood Scale (BRUMS).</p> | <p>There was no difference in disordered eating during pre-competition, competition or post-competition periods. Body dissatisfaction is higher in competition season, while the perfectionism is higher in pre-competition season. Ste study showed that all of the investigated variables varied along the athletic year.</p> | <p>As the body dissatisfaction rises during the competition season, even though there is no significant change in disordered eating and perfectionism during the athletic year, is there a chance to prevent eating disorders by concentrating on prevalence at that period of the year?</p> |

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|--|--|---|--|---|---|
| 5. Abood D. & Black D., 2000. Health Education Prevention for Eating Disorders Among College Female Athletes. <i>American Journal of Health Behavior</i> 24 (3), 209-219. | To decrease the risk of eating disorders in female college athletes. | 70 randomly selected athletes in 7 major university sports (volleyball, diving, cross-country, swimming, track, softball and basketball). | An 8 week long health education intervention and a comparison group. The intervention focused on promoting health attitudes and behaviours. | The health education decreased drive for thinness and increased self-esteem decreased body dissatisfaction. The health educating method, rather than focusing on ills, was effective and health education and intervention programme is needed. | Intervention decreases body dissatisfaction among athletes and by doing that, reduces the risk of disordered eating and so can be seen as a functional preventative method. |
| 6. Kerr G., Berman E. & De Souza M. J., 2006. Disordered Eating in Women's Gymnastics: Perspectives of Athletes, Coaches, Parents, and Judges. <i>Journal of Applied Sport Psychology</i> 18 (1), 28-43. | To understand better eating and weight control behaviour of female gymnasts. | All of the participants were from all across the Canada and all were somehow included in WAG. There were 95 gymnasts, 62 parents of gymnasts, 28 coaches, both man and female, 20 female judges and 15 retired female gymnasts. | The data was collected by a survey containing Likert scale, "yes" or "no", 1 to 10 rating scale, checklists and open-ended questions to allow both quantitative and qualitative analyses. | Every group had eating and weight control manners and all of the groups wanted to have education on nutrition and developing body for example. Coaches role was significant when it comes to developing disordered eating patterns. | There is a risk of getting an eating disorder even after the gymnastics career and at all ages the coach is in a key position to prevent the disordered eating from developing. |
| 7. Heffner J. L., Ogles B. M., Gold E., Marsden K. & Johnson M. 2003. Nutrition and Eating in Female College Athletes: A Survey of Coaches. <i>Eating Disorders</i> 11 (3), 209-220. | To get information from coaches on how the manage or monitor athletes eating and weight, their prevention or intervention capability and their attitudes towards the weight and eating in the sport. | The survey was send to 600 coaches and a total of 303 coaches from gymnastics, swimming, softball, basketball, track and volleyball took part in it. | A survey was developed, containing items from six general content areas: demographic information, coaching behaviours, availability of preventative/intervention services for athletes, knowledge of nutritional health issues, eating and weight related issues with athletes and attitudes towards them. | The results indicate that a significant portion of coaches tent to monitor and manage weight and eating even though there is knowledge of it influencing on some athletes so, that they develop disordered eating patterns. The coaches who engaged more in monitoring behaviours had more disordered eating patterns among their athletes. Gymnastics coaches had more of that behaviour but also more precautionary measures to their athletes. | Coaches have a great influence towards athletes in both developing as well as detecting/preventing disordered eating. Monitoring athletes weight and eating might lead on developing disordered eating patterns and excessive weight loss, but at the same time it helps to noticing developing eating disorders. |

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| 8. Heller Levitt D. 2008. Participation in Athletic Activities and Eating Disordered Behaviour. Eating Disorders 16 (5), 393-404. | To document trends and educate staff of university about eating disorders. | 853 students filled the questionnaire, all of which were usable. 68,8% of the participants were female and the mean age was 19,59 years. | The study was conducted as a questionnaire EAT-26. | The results indicate, that participating in recreational sports presents a greater risk compared to participation in organized sports. | Organised sports have a better ability to intervene in disordered eating at an early stage. |
| 9. Francisco R., Narciso I. & Alarcão M. 2013. Parental Influences on Elite Aesthetic Athletes' Body Image Dissatisfaction and Disordered Eating. Journal of Child & Family Studies 22 (8), 1082-1091. | The purpose was to study the role of family related variables in body dissatisfaction and disordered eating patterns. | The study involved 227 persons, 85 athletes and 142 control subjects as well as their parents (223 mothers, 198 fathers). The medium age of the participant adolescents was 15,35 years for athletes and 14,58 for controls. | Participants filled questionnaires regarding potential risk factors, parental influence, parental relationships, body dissatisfaction and level of disordered eating. | the influence of parents has a huge impact when it concerns the thinness or weight of the child, compared to parental guidance on dieting or body concerns | Parental influence needs to be taken into consideration when intervening. |

Examples of simplifications and categorising

| Original expression | Simplification | Subcategory | Category | Theme |
|---|---|---|--|--------------|
| One common distinction is to suggest that a disorder is not something chosen by the individual, as a strategy for sporting success for example, but is imposed upon the individual, in a fashion that bypasses their deliberate choice. (3) | Disordered eating behaviour might be chosen by an athlete as a sporting strategy but it might have an impact that bypasses their deliberate decision. (3) | Disordered eating as a chosen strategy (3) | Dieting | Risk factors |
| In summary, the results of this study suggest that a significant proportion of both athletes and coaches (particularly those involved in NCAA Division I athletics or gymnastics) have demonstrated unhealthy attitudes or behaviours related to athletes' eating and weight. (7) | A prominent proportion of coaches and athletes have demonstrated some unhealthy attitudes or behaviours towards eating or weight. (7) | Unhealthy attitudes towards eating and weight by coaches and athletes (7) | Culture of criticism and unhealthy attitudes | Risk factors |

| Original expression | Simplification | Subcategory | Category | Theme |
|---|---|--|-------------------------|------------|
| This randomized controlled trial shows that it is possible to prevent new cases of ED among adolescent female elite athletes through a school-based 1-yr intervention program. (2) | This study indicates that intervention programme is beneficial in preventing new cases of eating disorders among female elite athletes. (2) | Intervention programme in preventing new cases of eating disorders (2) | Effects of intervention | Prevention |
| Every group except the coaches recommended a change in "mind-set" regarding body image for female gymnasts. The preponderance of responses identified society's, media's and the gymnastics culture's emphasis on leanness and "the perfect body" as largely responsible for the problem of eating disorders. It was reassuring to find that most of the respondents, including the young current gymnasts, recognized the larger, contextual influences on body image and eating disorders, rather than internalizing these issues as personal ones. (6) | A mind set of the perfect body for a gymnast as being lean, was largely seen as a source of eating disorders in every group except for coaches. (6) | Change in a mind-set of a perfect gymnast body (6) | Change in mindset | Prevention |